



MIL-HDBK-217 Revision Status

Parts Standardization & Management Committee

October 30, 2008

Flight Systems Division
Crane Division, Naval Surface Warfare Center (NSWC
Crane)

Harnessing the Power of Technology for the Warfighter

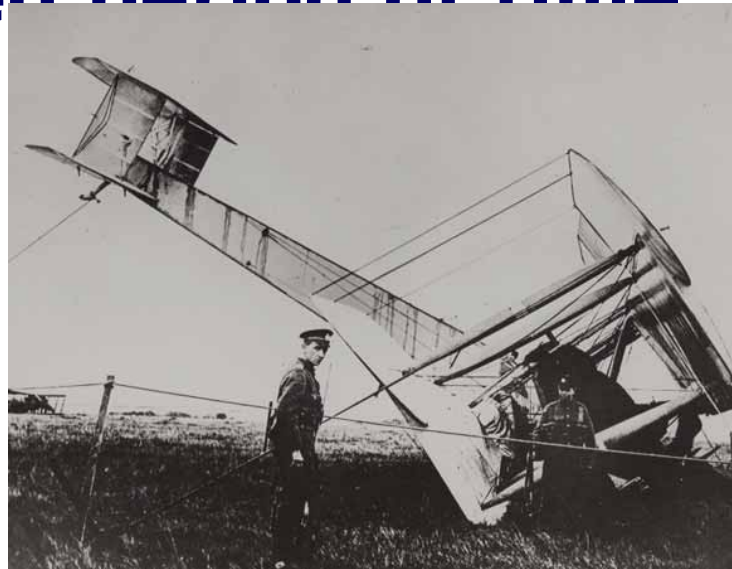


- **What an Why of Reliability**
- **MIL-HDBK-217 Background**
- **Scope of MIL-HDBK-217**
- **MTBF Survey**
- **217 Revision Phase 1 Overview**
- **217 Revision Phase 2 Overview**
- **Conclusion**

What is Reliability?



- **The probability of performing a specified function without failure under given conditions for a specified period of time**



(source: Curtiss-Wright Controls)



Why Do We Need Reliability?

- Improve the design of a product
- Reduce life cycle cost
- Logistics spares
 - How many do we need?
- Reliability can mean life to the War Fighter
 - When they squeeze the trigger or push the button they want to hear a “**BANG**” not a “click”
- Through the analysis of historical failure data, mathematical models were derived for determining component failure rates



MIL-HDBK-217 Background



- **MIL-HDBK-217 was the original reliability prediction tool**
 - **Developed by Rome Laboratory, published by DoD 1961**
- **World-wide known and accepted**
 - **Still widely used by commercial companies, defense industry, government organizations**
- **Currently an active Military Handbook**
 - **Latest revision is MIL-HDBK-217F Notice 2, dated 28 Feb 1995**
- **Preparing Activity responsibility was transferred from the Air Force (AF-11, Aeronautical Systems Center) to the Navy (Navy-NW, NSWC Crane) on 21 Feb 2001**



MIL-HDBK-217 Scope



“The purpose of this handbook is to establish and maintain consistent and uniform methods for estimating the inherent reliability of military electronic equipment and systems. It provides a common basis for reliability predictions during acquisition programs for military electronic systems and equipment. It also establishes a common basis for comparing and evaluating reliability predictions of related or competitive designs. The handbook is intended to be used as a tool to increase the reliability of the equipment being designed.”



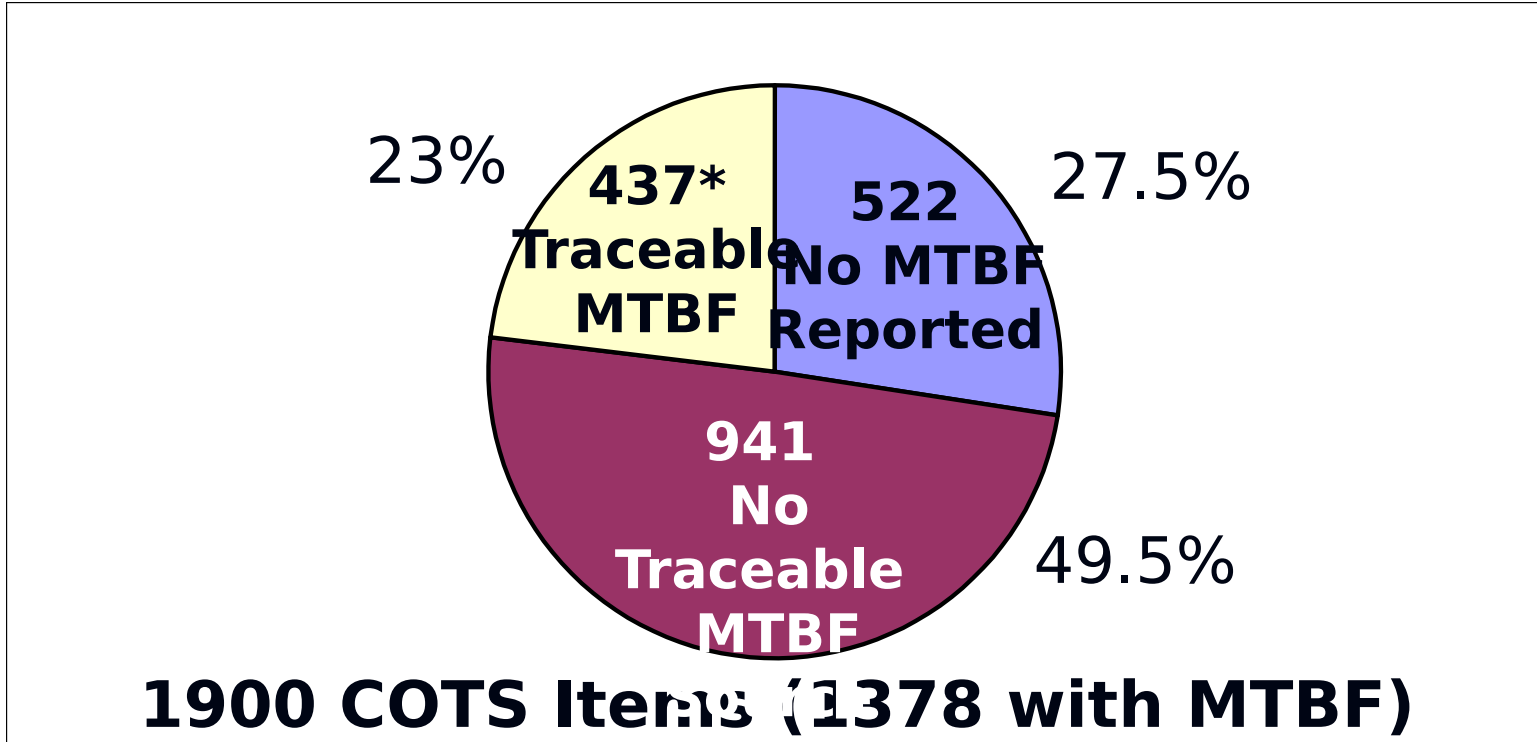
Traceable MTBF Survey



- **Mean Time Between Failure (MTBF)**
- **Study Initiated in 2004**
 - **NSWC Crane was tasked by the Defense Standardization Program Office (DSPO) to assess the “Feasibility of Standardizing COTS Module Reliability Predictions”**
- **Conclusions**
 - **Mil-HDBK-217 still being used as a primary source to calculate MTBF**
 - **There is a significant lack of consistency and control in calculating MTBF (not standardized)**



Traceable MTBF Survey Cont.



*** Less than 25% of items surveyed had published and traceable MTBF numbers!**



Why Revise 217?



- **217 is still the most widely known and used reliability prediction tool**
 - A majority of practitioners are still using MIL-HDBK-217 and want to continue to use it
- **Would help to eliminate, or at least reduce the number of people questionably modifying 217**
- **Would maintain a relatively simple prediction method**
- **Most users surveyed would like to see an revision**



MIL-HDBK-217 Revision



- **Direction from DSPO, Greg Saunders**
- **Lead Standardization Activity is OUSD(AT&L), Defense Systems/SSE/ED**
- **NSWC Crane Division as the Preparing Activity will revision 217 to rev. "G"**
- **MIL-HDBK-217 DoD custodians and reviewers**
- **Working group to perform the revision**
 - **Consists of government and industry**
- **Received Formal Request Letter From DSPO to revise 217 (27SEP07)**



Phase 1 Revision



- **Phase 1 Started Dec, 2007 (2 year task)**
- **End product of the task is MIL-HDBK-217 Revision G**
 - **Update will include a refresh of the data to make 217 current with today's part technologies**
 - **Models will be reviewed and modified if needed, but generally would remain intact**
 - **Update will not be a new reliability prediction approach**
 - **Goal is for 217 update to look and work as it does today**



Accomplishing the Revision



- **Developed a Questionnaire to collect information/volunteers from the Reliability community**
 - 130 Questionnaires Returned
 - 45 Volunteers for Working Group
 - 84 Volunteers to Review
- **Formed a 217 Working Group of Government and Industry (spring 2008)**
 - NSWCC Crane, NAVAIR, Wright Pat. AF, DLA, Sandia
 - Boeing, Raytheon, Lockheed Martin, Honeywell, BAE, RiAC, ReliaSoft, RELEX
- **Conducted First Working Group Meeting**
 - 7,8 May 2008
 - Indianapolis, IN
 - 20 Attendees





Accomplishing the Revision Cont.



- **Conduct monthly WebEx**
 - 2 hour meeting
 - Review status, questions, issues
 - Review sections when appropriate
- **Conduct quarterly face-to-face meetings**
 - 2-day meeting
 - Review work completed to date of each section
 - Address any questions, issues
- **Website Developed for Working Group**
 - **IEEE Hosted**



Accomplishing the Revision Cont.



- **Overall the proposed approach is a divide-and-conquer concept**
 - **Asking everyone how they would like to contribute**
 - **Data (Top Priority)**
 - **Can offer data from any part type to the working group to use**
 - **Assign an individual to a section of MIL-HDBK-217**
 - **Basically the individual would be responsible for executing the revision for the part type identified in the section**
 - Perform the revision and present back to the working group for comment / concurrence
 - **Responsible individual is free to conduct the revision of their section as they feel is best**
 - Perform the work themselves or enlist others
 - **Individuals having an assigned section will be provided with potential sources of help identified in responses to questionnaire**
 - **Plan is for a lot of the work pertaining to the part sections be accomplished “behind the scenes”**



– Addressed Data Collection

- **Top Priority**
- **Flyer** (Attachment)
 - RiAC Newsletter
 - IEEE Newsletter
 - International Applied Reliability Symposium (17-19JUN 08)
- **Presentation to JEDEC G-11 & G-12** (23-24 SEPT 08)
- **Requesting field failure return or test data**
 - Component Manufacturers
 - System integrators
 - Others

- **RiAC Process all Data**
 - Sanitize data (protect source of data)
 - Dave Nicholls, RIAC
- **Overview of data handling and process**
 - Collection
 - Evaluation
 - Processing

Phase 2 Revision



- **Developing concurrent with Phase 1**
- **Outline of task**
 - **Determine current needs**
 - **Beyond MIL-HDBK-217 Rev G**
 - **Survey Current Reliability Methodologies**
 - **217 Plus**
 - **Telcordia**
 - **Others**
 - **Evaluate Current Initiatives**
 - **Aerospace Vehicle Systems Institute (AVSI)**
 - **IEEE 1413 revision**
 - **Strengths/Weakness Assessment of each**



Phase 2 Revision Cont.



- **Develop Approach**
 - **Where do we go from here?**
 - **Compile Needs**
 - **MIL-HDBK-217 Appendix B**
 - » Current Technology Failure Mechanisms
 - **Community Acceptance**
 - **Long range reliability goals**
- **Develop Recommendations for the future**



Preparing Activity POC's



- **Lead**

- ***Phone: (812) 854-2398***

- **Alternate**

- ***Phone: (812) 854-2443***

- **Support**

- ***Phone: (812) 854-1797***





Conclusion



- **Any Questions?**

